



A CHECKLIST OF AVIFAUNA AND DIVERSITY STATUS FROM NAKANA LAKE, DISTRICT-DHULE, MAHARASHTRA, INDIA.

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ABSTRACT:

The bird diversity of Nakana Lake was represented by Total 62 species were recorded from study area which belongs 15 orders, 34 families and 52 genera. Density of total birds at year 2014-15 was (1905) and at year 2015-16 it was (1540). Amid these Order Passeriformes were found to be dominant with (31 %), Pelecaniformes (18 %), Coraciiformes with (10 %), Anseriformes with (8 %), Accipitriformes, Columbiformes, Cuculiformes and Gruiformes with (5 %), Bucerotiformes and Charadriiformes (3 %), Strigiformes and Otidiformes with (2 %) and rest of Falconiformes, Podicipediformes and Psittaciformes at (1 %) respectively. Nakana lake shown diverse and favorable habitats for significant creature of the ecosystem but birds are forever susceptible by anthropogenic activities. The present investigation of research work thrown a beam of light on richness, abundance and variety of diversity indices of wetland ecosystem, Nakana lake during couple of years study.

Keywords:- Passeriformes, Avifauna, Wetland, Density.

INTRODUCTION :

Birds are aesthetic beauty of the nation and major components of the ecosystem. Amid all vertebrates, the bird shows majority of variety. India subcontinent includes nearby 1300 species of birds i.e., with reference to 13 % of the world's avifauna which is nearly 9000 birds of the world. Unfortunately, India is in 3rd position for a large number of threatened and rare birds after Brazil and Indonesia, Walmiki *et al.* (2013). From Maharashtra 568 species of birds have been reported which belongs to 20 orders and 83 families, Acharya *et al.* (2010). They are good indicators of environment and eco-friendly because they contribute to the process of pollination and as seed dispersal agents. They play important role in dormancy of the seeds as well as being a component of the food web and convey the energy at the next trophic level. Birds are beneficial for pest

controlling agents that control insects and rodent pests, some are feeding dead-decaying material as scavengers. Some are serves as palatable flesh and eggs, Mony *et al.* (2018). Few once engaged in recreation. But some are devastating crops of farms and stored grains. They make ecosystem wealthy in their way by co-operating in the nutrient exchange between aquatic and terrestrial territories. The diversity and density of birds can imitate ecological trends in other organisms and obviously on their biodiversity. They can supply majority benefits directly or indirectly to the humans, Singh (2016).

All wetlands support huge number of flocks of resident as well as migratory birds as it has productivity and nutritional values. Birds are the most prominent and significant factor of freshwater wetland ecosystems. The presence and absence of avian fauna designate the



environmental situation of that habitat, Rudra *et al.* (2013).

Birds are widespread, mobile, common, and diverse. They are accommodated in a variety of habitats by like agricultural plantation, grasslands, deciduous and evergreen forests, mangroves bank of rivers, wetlands and sea beaches etc. fortunately India has served these types of ideal habitats maximally. They make use for the nesting, feeding, roosting and rearing of young once. According to Amat and Green (2010) Birds are bioindicators of the health of a related ecosystem in addition to habitat destruction, Pawar (2011).

MATERIAL AND METHODS :

The study site was visited monthly from Feb., 2014 to Jan., 2016. The morning after sunrise is the proper time for observation and minimizes the variation related to abundance. No playbacks have been used to attract the birds. For data collection aquatic, grassy, shrubby and barren land habitats were surveyed. Bird surveillances attained by binocular having the magnification of 8-16 x 40 (Olympus). Photography was done with the Cannon S x 50 HS and EOS 7D cameras with 150-300 lenses. The density of birds using transect method (Rodgers, 1991). Identification made through standard books by Ali (1996); Grimmett *et al.* (1999); Abdulahi (1972). The abundance of the birds was sorted according to Buden (1992): as Common (10-15 sightings/ day), Occasional (5-10 Sighting/ day), Uncommon (1-5 on most days) and rare (1-3 per season).

To determine the diversity indices, total number of species, total number of individuals in a sample and total numbers of individuals of species were determined. Diversity of organisms measured by different diversity indices like diversity, dominance, species evenness and species richness etc. but they are calculated independently (Kawade and Pandharkar, 2016). Diversity of the species designed directly with a

range of indices, among these two commonly used are Shannon- Weiner Index, denoted by (H), given by Shannon- Weiner Index (1963). Simpson's index or Index of dominance, denoted by (D) given by Simpson (1949). Species evenness was estimated by Pielou's evenness Index denoted by (J) given by Pielou, (1966). Richness was measured by Marglef's richness Index was denoted by (R) given by Marglef, (1958).

RESULTS AND DISCUSSION :

During the avifaunal survey different species were reported, total 62 species of birds with density (1905) were observed in the year 2014-15 while 54 species with density (1540) were reported in year 2015-16. They belonging to 15 orders, 34 families and 52 genera mention in table no.-1. Amid these Order Passeriformes were found to be dominant with (31 %), Pelecaniformes (18 %), Coraciiformes with (10 %), Anseriformes with (8 %), Accipitriformes, Columbiformes, Cuculiformes and Gruiformes with (5 %), Bucerotiformes and Charadriiformes (3 %), Strigiformes and Otidiformes with (2 %) and rest of Falconiformes, Podichipediformes and Psittaciformes at (1 %), mention in fig- 1.

Order Accipitriformes found the density with (12) and (6) observed in year 2014-15 and 2015-16 respectively. It has a family Accipitridae have 3 species i.e., *Buteo buteo*, *Haliastur indus* and *Spilornis cheela*. Order Anseriformes reported with density (556) in year 2014-15 and (482) in year 2015-16. It has single family Anatidae including 5 species viz., *Dendrocygna javanica*, *Anas poecilorhyncha*, *Aythya ferina*, *Anas crecca* and *Anas strepera*. Order Bucerotiformes displayed with density (11) and (8) in both years. It has 2 families, Bucerotidae with single species- *Ocyeros birostris* while family Upupidae with also a species- *Upupa epops*. Charadriiformes order exhibited with 2 families first was Laridae with a species *Sterna aurantia* and second was Scolopacidae with again single

species, *Tringa hypoleucos*. Density of this order was (63) and (49) during couple of year respectively. Columbiformes order found density with (107) in year 2014-15 and (94) in year 2015-16. It has single family Columbidae with 3 species viz., *Streptopelia senegalensis*, *Streptopelia Chinesis* and *Streptopelia decaocto*.

Order Coraciiformes showed density (87) and (76) during year 2014-15 and 2015-16 respectively. This order displayed with 3 families like, Alcedinidae which has 3 species such as *Alcedo atthis*, *Halcyon smyrnensis* and *Ceryle rudis* however family Coraeiidae with single species, *Coracias benghalensis* as well as family Meropidae with 2 species i.e., *Merops philippinus* and *Merops orientalis*. Next one to order Cuculiformes has a family Cuculidae with 3 species *Clamator jacobinus*, *Eudynamys scolopaea* and *Eudynamys scolopaea*. Density of this order displayed as (13) in year 2014-15 and (15) in year 2015-16. Observed density of Order Falconiformes were (6) and (4) in year 2014-15 and 2015-16 respectively. It has single family Falconidae and single species, *Falco tinnunculus*. Density of order Gruiformes displayed with (74) and (75) in both years included single family Ralidae and it has 3 species i.e., *Fulica atra*, *Gallinula chloropus*, and *Porphyrio porphyrio*.

Order Passeriformes revealed density were (327) in year 2014-15 and (246) in year 2015-16. It included 13 families: Alaudidae has single species- *Mirafra cantillans*, family Campephagidae has single species- *Pericrocotus cinnamomeus*, family Cystocolidae has single species- *Prinia socialis*, next one was Dicruroidae with single species- *Dicrurus macrocercus*, family Esrildidae has 2 species namely, *Amandava amandava* and *Lonchura malabarica*. Laniidae family has 2 species, *Monticola solitarius* and *Lanius vittatus*. Family Motocillidae has 4 species i.e., *Anthus rufulus*, *Anthus trivialis*, *Motacilla flava* and *Motacilla maderaspatensis*. Monarchidae family has single species-

Terpsiphone paradise. Family Muscicapidae has 2 species such as *Copsychus saularis* and *Cyornis tickelliae*. Family Ploceidae has single species- *Ploceus philippinus*. Rhipiduridae family has single species- *Rhipidura aureola*. Family Turdidae has single species- *Geokichla citrine*. Lastly family Sternidae has again single species- *Sturnia pagodarum*.

Order Pelecaniformes reported density were (448) and (356) in year 2014-15 and 2015-16 respectively. It includes 4 families. Family Ardeidae having 8 species viz., *Egretta garzetta*, *Ardea cinerea*, *Ardea purpurea*, *Ardea alba*, *Bubulcus ibis*, *Aythya fuligula*, *Ardeola grayii* and *Nycticorax nycticorax* etc. Family Ciconiidae has a species- *Ciconia episcopus*. family Phalacrocoracidae has single species- *Phalacrocorax niger*. Last of all family Threskiornithidae has single species- *Plegadis falcinellus*.

Podichipediformes order has single family Podichipedae with single species- *Tachybaptus ruficollis* with density (176) during year 2014-15 and (127) in year 2015-16. Order Psittaciformes observed density was (4) and (2) in year 2014-15 and 2015-16 respectively. It has single family Pistacidae has a species- *Psittacula cyanocephala*. Order Strigiformes has single family Strigidae which included single species- *Otus sunia* with their density (2) during year 2014-15 only. Finally order Otidiformes has observed density was (1) just in year 2014-15 and it has single family Otididae was reported with a species- *Ardeotis nigriceps*. Our results were correlated with some researchers, Tak *et al.* (2010); Verma (2011); Sinnarkar *et al.* (2013). Observations shows evident of density of orders were ruled as following manner: Anseriformes > Pelecaiformes > Passeriformes > Podichipediformes > columbidormes > Coraciformes > Gruiformes > Charadriiformes > Cuculiformes > Accipitriformes > Bucerotiformes > Fulconiformes > Psittaciformes > Strigiformes

> Otidiformes at throughout research tenure, mention in fig.-2.

Demonstrated positions of density of the avifauna were declined in the year 2015-16 as compare to 2014-15 except *Fulica atra* and *Clamator jacobinus*. Total 6 species viz., Common buzzard, Blue rock thrush, Eurasian tree pipit, Asian paradise flycatcher, Orange headed thrush. Woolly necked stork, Oriental scopes owl and Great indian bustard etc. were not sighted during year 2015-16. Common pochard has shown maximum abundance while Great Indian bustard and Oriental scope owl with least count in year 2014-15 but deceasing status were reported in year 2015-16 of Common pochard. The Great Indian bustard and Oriental scope owl were not sighted in the year 2015-16. Resident as well as migratory water birds was observed abundantly in year 2014-15 while they were critically decreased in year 2015-16. Some researchers were correlated with our results such as Tak *et al.* (2010); Verma (2011); Sinnarkar *et al.* (2013).

Birds with their abundance were observed as: 13 species were common (21.6 %), 22 species were uncommon (35.4 %), 15 species were occasional (24.1 %) and 12 species were found rarely (19.3 %). Regarding their habits birds were reported as: 41 species were resident (63.1 %) while rest of 21 species was migratory (36.9 %). Concern their habitats birds were revealed as: 33 species were tree (53.2 %) however 29 species were wetland (46.8 %). Ekhande *et al.* (2012); Lad and Patil (2015) were corroborated with this part of research work.

The Sparrow, Green bee eater and flycatchers are feeding on insect pest which is harmful to agricultural goods. Kite, owl and hawk prefer the rodents which are not only stored grain pest but they spread carry pathogens of various diseases. Nature's well-known scavengers are vultures, crows and kites, Day *et al.* (2013).

Bivate and Patil (2016). Observed 122 avifaunal species from Shivaji University Campus, Dist.-Kolhapur, Maharashtra, India. 122 species were sighted during study period, they conclude that the campus of Shivaji University is rich in diversity of birds. Ghadigaonkar *et al.* (2016). Studied diversity status of Ajuba fort, Thane district, Maharashtra, India, during Sept., 2012 to Aug., 2014. They observed 85 species of birds. The authors suggested an urgent need to conserve this area. Puri and Virani (2016). Studies avian diversity of Khairbandha Lake in Gondia District, Maharashtra State, India, for the period of Feb., 2014 to Jan., 2016. They reported 86 bird species Throughout the study duration Family Anatidae was dominant with 15 species. Wanjari (2016). Documented 41 species of aquatic birds in and around Ekburji reservoir located near the Washim district of Maharashtra state during the year 2013 to 2015. Kadam and Dhar (2017). Reported 48 species of birds from coastal village Bordi. They selected 6 different sites, in and around area of Bordi situated in Dist.- Palghar, Maharashtra during the study period, Jun., 2013 to Dec., 2016. Dabhade and Poul (2017). Revealed checklist of avian diversity of Madhavrao Patil college campus, Dist.-Palam, Parbhani, Maharashtra, India. They observe 45 species of birds belonging to 26 families and conclude that the campus of the Madhavrao Patil College is a potential site for bird. Karikar *et al.* (2017). Observed total 72 wetland bird species from two lakes during Apr., 2014 to Mar., 2016. Among these 70 bird species were reported from Palasdev and 42 aquatic species were reported from Badalwadi. Similarity about both study area estimated by similarity index which is 0.58. Telkhade and Jambhule (2017). Carried out field survey of the urban region of Padmapur area of Chandrapur District during Feb., 2012 to Jan., 2013. Total 28 bird species were recorded by authors. Jaiswal and Sing (2017). Assessed 14

avifaunal species Setganga area 15 km away from Mungeli city on Kawardha road. Mungeli city harbours wide variety of birds because proper food availability in different seasons. Nefla *et al.* (2021). Studied detailed data on parameters of Magreb Magpie (*Pica mauritanica*) in their geographic range (North Africa) and long-term conservation plans of this endangered species with reproductive ecology.

Diversity indices

Estimation of some diversity indices was the major part of this research because these values were demonstrating the actual diversity status of any ecosystem. Evaluated values of various diversity indices were mention in Table no. -2.

The present piece of research work thrown a beam of light on richness, abundance and variety of diversity indices of wetland ecosystem, Nakana lake during couple of years study. The richness of avifauna was (62) in the year 2014-15 and (54) in the year 2015-16. The abundance of species was (1905) and (1540) in the year 2014-15 and 2015-16 which show a drastic difference. Values of Shannon-Weiner Index were observed (123.5794) and (128.7367). Simpson's Dominance Index was (0.051043) (0.052732) however Simpson's Index of Diversity was (0.948956) (0.947268) while Simpson's Reciprocal Index (19.591324) (18.963817) in the year 2014-15 and 2015-16 respectively. To demonstrate the similar diversity above 3 indices were used which are correlated to each other. The Margalef's Index shown the Richness of bird species which were (8.6067) and (7.3574) whereas the evenness expressed by the Pielou's Index i.e. (29.94316) and (30.98018) in the year 2014-15 and 2015-16 respectively. Along with these Simpson's Dominance Index as well as Pielou's Evenness Index was found to be increased their values in 2015-16 as compare to 2014-15 while the rest of indices were shown decreasing values in 2015-16 as compare to 2014-15. Some studies like Ekhande *et al.*

(2012); Odewumi *et al.* (2017); Parimala and Asiya Nuzhat (2018); Hung-Ming *et al.* (2020) were supported by our findings.

CONCLUSION :

No dough, Nakana lake provides different type of habitats to accommodate variety of avifaunal species and declared as a bird sanctuary but anthropogenic activities like fishing, cattle grazing, cattle bathing, wood cutting, use the lake area as: recreation, cooking of food and playing are the thing which are disturbed the natural habitat and their peaceful environment. The abundance of fishes was increased in the next year of study period as compare to first year. But no effect was observed on the diversity and density of birds. Sound and smoke of the vehicles are drastically affected on birds that brought by people in study area. People also utilized the shore of the lake as playing ground. Various musical instruments are played during the procession of Lord Ganesha and Lourdes Durga at Ganesh Chaturdashi and Vijayadashmi. Hence there is an urgent need to conserve the ecosystem from above human activities. Monitoring these sites regularly should be carried out to control changes in the situation of wetland territory.

REFERENCES:

- Abdulahi, H. (1972). Checklist of Birds of Maharashtra. Bombay Natural History Society, Mumbai.
- Acharya, B. K., Vijayan, L. and Chettri, B. (2010). The bird community of Shingba Rhododendron wildlife sanctuary Sikkim, Eastern Himalaya, India. *Tropical Ecol.* 51(2):149-159.
- Ali, S. (1996). The Book of Indian Birds. BNHS, Oxford University Press., Mumbai, pp-354.
- Amat, J. A. and Green, A. J. (2010). Water birds as Bio-indicators of Environmental Conditions. Conservation Monitoring in

- Freshwater Habitats, *Springer Netherlands*, 2(5): 45-52.
- Bivate, S. B. and Patil, N. S. (2016). Avian diversity in and around the Shivaji University campus, Kolhapur district, Maharashtra, India, *Biolife*, 4(4): 653-660.
- Buden, D. W. (1992). Birds of the Exumas, Bahama Island, *Wilson bull.*, 04: 674-698.
- Dabhade, V. and Poul, S. V. (2017). Checklist of Bird Diversity of Madhavrao Patil college campus, Palam District, Purbhani, Maharashtra, India, *Int. J. Curr. Microbial. App. Sci.*, 6(3): 1906-1910.
- Dey, A., Deb, D., Chudhuri, S. D. and Chudhuri, P. S. (2013). A preliminary study on avifaunal diversity of Maharaja Bir Bikram College Campus, Tripura, North East India. *Int. Multidis. Res. J.* 3(2): 36-43.
- Ekhande, A. P., Patil, J. V. and Padate, G. S. (2012). Study of birds of Yashwant lake with respect to densities, species richness and shanon- Wiener Indices and its correlated with lake dynamics. *Europ. J. of Zool. Res.*, 1(1): 6-15.
- Ghadigaonkar, P., Bandekar, P., Pandirkar, A., Kuwar, A., Jangam, P., Todankar, R. and Karve, H. (2016). Avian Diversity in and around Ajoba Fort, Thane district, Maharashtra India, *Int. Res. J. of Biol. Sci.* 5(2):7-15.
- Grimmett, R., Inskipp, C. and Inskipp, T. (1999). Pocket Guide to The Birds of the Indian Subcontinent, Oxford University Press, Delhi.
- Hung-Ming, T., Meng-Wen, F. and Jerome, Chie-Jen, Ko. (2020). Different Habitat Types Affect Bird Richness and Evenness. *Science Reports*, 10, Article number: 1221, pp. 1-6.
- Jaiswal, P. and Sing, R. K. (2017). Study of Biodiversity of Birds in Setganga, District Mungeli, Chhattisgarh. *W. J. of Pharma and Pharmacu. Sci.*, 6(6): 1878-1881.
- Kadam, S. S. and Dhar, A. S. (2017). Status and diversity of avian fauna in and around Bordi region, West coast of India, *Int. Res. J. Biological Sci.* 6(5): 15-18.
- Karikar, S., Mali, S. and Kulkarni, P. (2017). Status of Wetland birds at associated lakes of Ujjani Reservoir, Maharashtra, India. *Int. J. of Appl. Environ. Sci.*, 12(5): 909-924.
- Lad, D. and Patil, S. (2015). Status and Diversity of Avian fauna in the estuarine wetland area of Bhayander and Naigaon, Maharashtra, India. *Bioscience Discovery*, 6(1): 39-44.
- Mony, M., Selvam, M. K. and Dorai, P. K. (2018). Interactive Phenomenon of Plants and Avian Diversity in Vettangudi Birds Sanctuary, Southern India, Research Article, *Science International*. 6(2): 65-70.
- Nefla, A. Ouni, R., Selmi, S and Nouria, S. (2021). Breeding biology of relictual Magbreb Magpie (*Pica mauritanica*) population in Tunisia. *Avian Res.* 12(12): 1-9.
- Odewumi, O. S., Okosodo, E. F. and Talabi, O. (2017). Diversity and Abundance of Avian Species of Owena Multipurpose Dam, Onto State, Southwest, Nigeria, *J. Biodivers. Biopros. Dev.*, 4(1): 2-6.
- Parimala, B. and Asiya Nuzhat, F. B. (2018). Avifaunal diversity and status of Bhimasandra Pond, Tumakuru District, Karnataka, India. *Int. J. of Inno. Res. in Sci., Engen. and Tech.* 7(4): 4313-4320.
- Pawar, P. R. (2011). Species diversity of Birds in Mangroves of Uran (Raigad), Navi

- Mumbai, Maharashtra, West coast of India. *J. of Experimental sci.*, 2(10): 73-77.
- Puri, S. D. and Virani, R. S. (2016). Avifaunal diversity from Khairbandha Lake in Gondia district, Maharashtra State, India, *Bioscience Discovery*, 7(2): 140-146.
- Rodgers, W. A. (1991). Techniques for Wildlife census in India, A field Manual. Wildlife Institute of India, Deharadun, India.
- Rudra, N. P., Das, U. P., Mohapatra, R. K. and Mishra, A. K. (2013). Checklist of Birds in and Around Ansupa Lake, Odisha, India, *Int. Res. J. Env. Sci.* 2(11): 9-12.
- Singh, R. B. (2016). Beautiful Avifauna of Waghoba Forest of Palghar Maharashtra. *Ind. J. of Res.*, 5(12): 495-498.
- Sinnarkar, K., Hule, A. S., Dalvi, R. S. and Kamath, V. (2013). Avian diversity in Mahim Bay, Mumbai. *Proc. Nat. Conf. on Biodiver.: Status & Challenges in Conservation-'FAVEO'* 2(7): 1-6.
- Tak, P. C., Sati, J. P. and Rizvi, A. N. (2010). Status of water birds at Hathnikund Barrage wetland, Yamunanagar District, Haryana, India. *J. of Threat. Taxa.* 2(4): 841-844.
- Telkhade, P. M. and Jambhule, S. H. (2017). Avifaunal Diversity of Padmapur Area, Dist. - Chandrapur Maharashtra, India, *Int. J. of Res. In Biosci., Agri. and Tech.*, 5(1): 57-59
- Verma, S. K. (2011). A preliminary survey on the avian community of Dalma wild life sanctuary, Jharkhand, India, *J. of Threatened Taxa*, 3(5):1764-1770.
- Walmiki, N., Karangutkar, S., Yengal, P., Pillai, R., Ajsaonkar, P., Singh, N. and Sagre, P. (2013). Avian diversity in and around Bassein Fort and Creek, District Thane, Maharashtra. *Int. J. of Adv. Res.*, 1(3): 73-85.
- Wanjari, H. V. (2016). Diversity of aquatic birds of Ekburji reservoir, Washim, M.S. India. *Int. J of Fisheries and Aqua. Stud.*, 4(5): 192-195.

Table-1, Species wise percentage of birds from Nakana lake during Feb., 2014-16

Sr. No.	No. of Species	2014-15	2015-16	Sr. No.	No. of Species	2014-15	2015-16
Accipitriformes (3)				Passeriformes (19)			
1	Common Buzzard	0.2	0	30	Small Minivet	1.31	1.49
2	Braminy Kite	0.1	0.12	31	Ashy Prinia	0.62	0.45
3	Crested Serpent-Eagle	0.3	0.25	32	Black Drongo	2.04	2.33
4	Lesser Whistling Duck	2.62	10.38	33	Red Munia	2.09	2.2
Anseriformes (4)				34	White-throated Munia	1.25	1.23
5	Spot billed Duck	8.55	10.38	35	Blue Rock-Thrush	0.1	0
6	Common Pochard	11.86	11.94	36	Bay-backed Shrike	0.1	0.32
7	Common Teal	0.36	0.25	37	Paddyfield Pipit	0.68	0.58
8	Gadwall	5.77	5.97	38	Eurasian Tree Pipit	0.1	0
Bucerotiformes (2)				39	Westan Yellow Wagtail	0.62	0.58
9	Indian Grey Hornbill	0.1	0.19	40	White browed wagtail	0.47	0.25
10	Common Hoopoe	0.47	0.32	41	Asian Paradises-Flycatcher	0.1	0
Charadriiformes (2)				42	Oriental Magpie-Robin	0.41	0.32
11	River Tern	2.51	2.33	43	Tickell's blue-flycatcher	0.15	0.06
12	Common sandpiper	0.78	0.84	44	Baya Weaver	3.88	3.37
Columbiformes (3)				45	White-browed Fantail	0.36	0.38
13	Little Brown or Laughing dove	3.72	4.35	46	Orange-headed thrush	0.2	0
14	spotted Dove	1.46	1.16	47	Brahminy Starling	2.36	2.14
15	Eurasian Collared dove	0.41	0.58	Pelecaniformes (11)			
Coraciiformes(5)				48	Little Egret	2.78	2.79
16	Common Kingfisher	0.36	0.32	49	Grey Heron	0.47	0.64
17	White-Breasted Kingfisher	0.62	0.58	50	Purple Heron	0.57	0.84
18	Lesser pied Kingfisher	0.36	0.38	51	Large Egret	0.41	0.38
19	Indian Roller	0.1	0.51	52	Cattle Egret	6.77	6.36
20	Blue-tailed Bee-eater	0.62	0.64	53	Tufted Duck	4.3	4.22
21	Green Bee-eater	2.46	2.46	54	Indian Pond-Heron	1.46	1.42
Cuculiformes (3)				55	Black-crowned Night-Heron	0.2	0.32
22	Pied Crested Cuckoo	0.36	0.25	56	Wolly -necked Stork	0.1	0
23	Asian Koel	0.2	0.38	57	Little Cormorant	5.14	4.93
24	Greater Coucal	0.1	0.32	58	Glossy Ibis	1.25	1.16
Falconiformes (1)				Podichipediformes (1)			
25	Common Kestrel	0.3	0.25	59	Little Grebe or Dabchik	9.23	8.24
Gruiformes (3)				Psittaciformes (1)			
26	Common Coot	2.57	2.72	60	Plum-headed Parakeet	0.2	0.12
27	Common Moorhen	0.47	0.38	Strigiformes (1)			
28	Purple Moorhen	0.83	1.75	61	Oriental Scops-Owl	0.1	0
Passeriformes (19)				Otidiformes (1)			
29	Singing Bush-Lark	0.2	0.19	62	Great Indian Bustard	0.05	0

Table- 2, Bird species Richness, abundance, dominance and diversity indices of Nakana lake during Feb., 2014 to Jan., 2016.

Sr. No.	Bird	2014-15	2015-16
1	Species Richness	62	54
2	Species abundance	1905	1540
3	Shannon-Weiner Index	128.7367	123.5794
4	Simpson’s Dominance Index	0.051043	0.052732
5	Simpson’s Index of Diversity	0.948956	0.947268
6	Simpson’s Reciprocal Index	19.591324	18.963817
7	Margalef’s Richness Index	8.6067	7.3574
8	Pielou’s Evenness Index	29.94316	30.98018

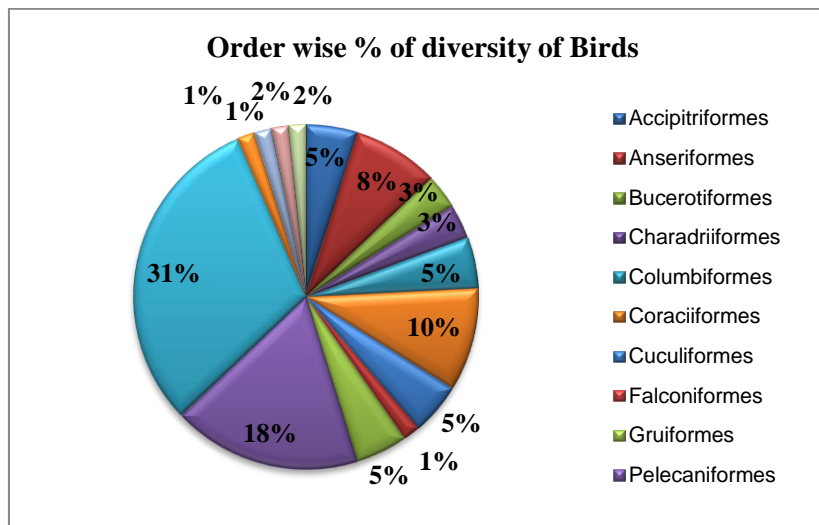


Fig- 1, Order wise percentage of diversity of birds from Nakana lake during Feb., 2014-15 to 2015-16.

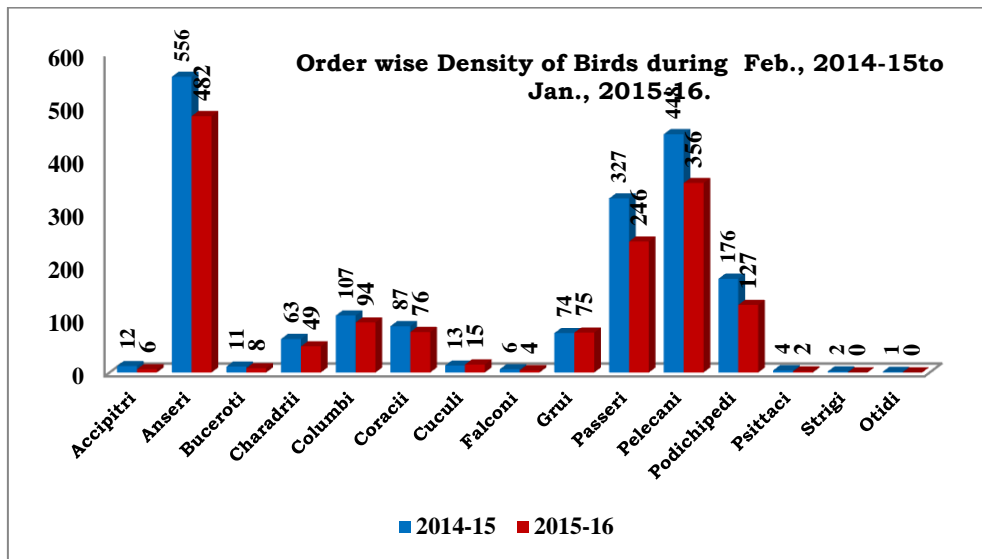


Fig.- 2, Graphical representation of Density of birds of various orders during Feb., 2014-15 to Jan., 2015-16.